																		Lifetim	ne Amount Capital C	ost				
														Baselii	ine of Engines			Emitte	d After Effective	ness	Baseline of Er	ngines		
								Vehicle Miles						Retrof	fitted per year Amou	nt Reduced Life	time Baseline of Lifetime	Amount Retrofi	it, Retrofitted (\$/short	ton),	Retrofitted p	er year Amount Reduce	d Lifetime Bas	seline of
			Number of Engine	s		Technology		Traveled/Year					Percent Red	uced (NOx,	short per Ye	ear(NOx, short Eng	ines Retrofitted Reduce	d (NOx, Engine	s (NOx, short Retrofitt	ed Engines Percent Reduce	d (PM2.5, shor	rt per Year(PM2.5,	Engines Ret	trofitted
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installatio	n Cost (NOx, %)	tons/v	year) tons)	(NC	ox, short tons) short to	ins) tons)	(NOx)	(PM2.5, %)	tons/year)	short tons)	(PM2.5, sho	ort tons)
						Engine																		
						Replacement -																		
Marina Vaccale	Commercial Fishing	Propulsion		1	1996	2018 Diesel	LILSD			65		\$31 120	\$23.750	-57%	0.3837	-0.2187	0.3837	-0.2187	0.6024	\$0.00	45%	0.0121 0.0	054	0.0121

	Retrofit, Retrofitted	Effectiveness i (\$/short ton),		Baseline of Engines Retrofitted per year (HC, short tons/year)			Lifetime Amount Reduced (HC, short	Retrofit, Retrofitted	Effectiveness (\$/short ton),	Percent Reduced (CO, %)		r year Amount Redu	hort Engines Re	iseline of Lifetime Am trofitted Reduced (CC tons) tons)	Emitted Afte ount Retrofit, Retr		s		er year Amount Reduc	ed Lifetime Baseline short Engines Retrofitt (CO2, short tons)	ed Reduced (CO2,	Emitted After Retrofit, Retrofit		,
0.005	4 0.006	7 \$10,075,649.4	48 -79	6 0.011	L -0.0008	0.011	0.0008	0.0117	\$0.00) -104	% (0.0658 -0	0.0684	0.0658	-0.0684	0.1342	\$0.00 4	0%	10.125	4.05 10.:	25 4.	.05 ε	i.075 \$13,	,548.15

																			Lifetime Amount	Capital Cost				
														Baseline	of Engines				Emitted After	Effectivenes	is	Baseline of Engi	ines	
								Vehicle Miles						Retrofitt	ed per year Amount	Reduced Life	time Baseline of L	ifetime Amount	Retrofit, Retrofiti	ed (\$/short tor	1),	Retrofitted per	ryear Amount Reduced	Lifetime Baseline of
			Number of Engine	s		Technology		Traveled/Year					Percent Redu	ced (NOx, sh	ort per Year	(NOx, short Eng	ines Retrofitted F	Reduced (NOx,	Engines (NOx, sh	ort Retrofitted	Engines Percent Reduced	(PM2.5, short	per Year(PM2.5,	Engines Retrofitted
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation	Cost (NOx, %)	tons/yea	ir) tons)	(NO	(x, short tons) s	hort tons)	tons)	(NOx)	(PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)
						Engine																		
						Replacement -																		
Administration of the country	Commorcial Eichie	a Dropulsion		1	2007	2019 Diocol	HIED			42E		44 106	620,000	200/	2.4457	0.7227	20.249	0.00	14 20 5	126 6	0.437.14	ane/ n	0772 0.044	64 0.0272

Lifetime Amount Retrofit, Retrofitted (\$/short ton), Reduced (PM2.5, Engines (PM2.5, Retrofitted Engines Percent Reduced	hort Engines (HC, short Retrofitted Engines Percent Reduc	Retrofitted per year Amount Reduced Lifetime Baseline of Lifetime Amount ced (CO, short per Year(CO, short Engines Retrofitted Reduced (CO, short	ort Engines (CO, short Retrofitted Engines Percent Reduced (CO2, short per Year(CO2, short Engines Retrofitted Reduced (CO2,	Engines (CO2, short Retrofitted Engines
short tons) short tons) (PM2.5) (HC, %) 0.5564 0.3709 \$133,349,64 51%	tons) (HC) (CO,%)	tons/year) tons) (CO, short tons) tons) 2% 0.5859 0.0117 7.0303 0.1400		tons) (CO2) .625 880.875 \$563.69

																		Lifetin	ne Amount	Capital Cost				
														Baseline o	Engines			Emitt	ed After	Effectiveness		Baseline of Engines		
								Vehicle Miles						Retrofitted	per year Amount R	educed Lifeti	ime Baseline of Lifetime A	mount Retro	it, Retrofitted	(\$/short ton),		Retrofitted per year	Amount Reduced	Lifetime Baseline of
			Number of Engir	nes		Technology		Traveled/Year					Percent Reduc	ced (NOx, shor	per Year(f	Ox, short Engir	nes Retrofitted Reduced (I	NOx, Engin	es (NOx, short	Retrofitted Engines	Percent Reduced	(PM2.5, short	per Year(PM2.5,	Engines Retrofitted
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation C	ost (NOx, %)	tons/year)	tons)	(NOx	c, short tons) short tons) tons)		(NOx)	(PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)
						Engine																		
						Replacement -																		
Marine Vessels	Commercial Fish	hing Propulsion		1	1996	2018 Diesel	ULSD			225	\$43	3,867	\$8,475	55%	0.2143	0.1179	0.2143	0.1179	0.0964	\$444,106.47	34	6 0.001	5 0.000	6 0.0016

	Retrofit, Retrofitte	Effectiveness d (\$/short ton),			Amount Reduced	Lifetime Baseline of Engines Retrofitted (HC, short tons)	Lifetime Amount Reduced (HC, short	Retrofit, Retrofitted Engines (HC, short	Effectiveness (\$/short ton), Retrofitted Engines	Percent Reduced (CO, %)		r year Amount Reduc	nort Engines Re	aseline of Lifetime Ame strofitted Reduced (CC tons) tons)		Effe fitted (\$/s	ctiveness hort ton), rofitted Engines Percent Reducer		ear Amount Reduce	I Lifetime Baseline of ort Engines Retrofitted (CO2, short tons)	d Reduced (CO2,		Effective ted (\$/short	ness ton),
0.000	06 0.001	1 \$94,867,410.4	3 659	% 0.0054	\$ 0.0035	5 0.0054	0.0035	0.0019	\$15,031,295.87	399	% 0).0348 O.	.0136	0.0348	0.0136	.0212	\$3,854,178.43	40%	27	0.8 2	27 10	3.8 :	16.2	\$4,846.48

																		Lifetime	Amount Cap	pital Cost				
														Baseline o	Engines			Emitted	After Effe	ectiveness		Baseline of Engin	ies	
								Vehicle Miles						Retrofitted	per year Amount F	teduced Lifetime Ba	aseline of Lifetime A	mount Retrofit,	Retrofitted (\$/s	short ton),		Retrofitted per y	ear Amount Reduced	Lifetime Baseline of
			Number of Engine	is .		Technology		Traveled/Year					Percent Reduc	ed (NOx, shor	per Year(NOx, short Engines Re	trofitted Reduced	NOx, Engines	(NOx, short Ret	trofitted Engines P	ercent Reduced	(PM2.5, short	per Year(PM2.5,	Engines Retrofitted
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation Co.	t (NOx, %)	tons/year)	tons)	(NOx, shor	t tons) short tons	i) tons)	(NC	Ox) (F	PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)
						Engine																		
						Replacement -																		
Marino Maccolc	Commercial Fishing	Propulsion		1	1977	2018 Diecel	HISD			200		¢42.067 ¢	D 47E	E19/	0.6746	0.2441	0.6746	0.2441	0.3306	¢152 122 26	110	e/ 0.00	000	04 0.0024

Lifetime Amount Capital Cost

	Emitted After	Effectiveness		Baseline of Engines				Emitted After	Effectiveness		Baseline of Eng	gines			Emitted After	r Effe	ctiveness	Baseline of	Engines			Emitted After	Effectiveness
Lifetime Amount	Retrofit, Retrofitted	(\$/short ton),		Retrofitted per year	Amount Reduced	Lifetime Baseline of	Lifetime Amount	Retrofit, Retrofitted	(\$/short ton),		Retrofitted per	year Amount Reduced	d Lifetime Base	eline of Lifetime Amou	int Retrofit, Retr	ofitted (\$/s	hort ton),	Retrofitted	per year Amount Reduc	ed Lifetime Baseline	of Lifetime Amount	Retrofit, Retrofitte	ed (\$/short ton),
Reduced (PM2.5,	Engines (PM2.5,	Retrofitted Engines	Percent Reduced	(HC, short	per Year(HC, short	Engines Retrofitted	Reduced (HC, short	Engines (HC, short	Retrofitted Engines	Percent Reduced	(CO, short	per Year(CO, sho	rt Engines Retro	ofitted Reduced (CO,	short Engines (CO,	short Reti	rofitted Engines Percent Reduc	d (CO2, short	per Year(CO2, s	hort Engines Retrofitte	d Reduced (CO2,	Engines (CO2, sho	ort Retrofitted Engines
short tons)	short tons)	(PM2.5)	(HC, %)	tons/year)	tons)	(HC, short tons)	tons)	tons)	(HC)	(CO, %)	tons/year)	tons)	(CO, short to	ns) tons)	tons)	(CO	(CO2, %)	tons/year)	tons)	(CO2, short tons)	short tons)	tons)	(CO2)
-0.0004	1 0.003	B \$0.0	0 619	0.0169	0.0103	0.0169	0.0103	0.0066	\$5,087,738.53	31	% 0	.1096 0.0	034	0.1096	0.034	0.0756	\$1,540,208.69	40%	95.625	8.25 95.6	25 38.3	25 57.37	375 \$1,368.42

Lifetime Amount Capital Cost

Lifetime Amount Capital Cost

																			Lifetime Amount	Capital Cost				
														Baseline o	of Engines				Emitted After	Effectiveness		Baseline of Eng	gines	
								Vehicle Miles						Retrofitte	d per year Amount I	Reduced Lifetin	me Baseline of Life	etime Amount	Retrofit, Retrofitter	d (\$/short ton),		Retrofitted per	er year Amount Reduced	Lifetime Baseline of
			Number of Engines			Technology		Traveled/Year					Percent Redu	ced (NOx, sho	rt per Year(NOx, short Engin	es Retrofitted Re	duced (NOx,	Engines (NOx, shor	t Retrofitted Engir	es Percent Reduced	(PM2.5, short	per Year(PM2.5,	Engines Retrofitted
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation	Cost (NOx, %)	tons/year) tons)	(NOx,	, short tons) she	ort tons)	tons)	(NOx)	(PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)
						Engine																		
						Replacement -																		
Administration of the country	Commorcial Eichig	a Bronulsion		1 2	002	2019 Dioreil	HIED			420	e	44 106	¢20.000	109/	2 075	0.5463	2 075	0.5462	2 421	2 61	100 2	ne/ r	0.0073 0.034	62 0.0072

short tons) short tons) (PM2.5) (HC, %) tons/year) tons) (HC, short tons) tons) tons) (HC) (CO, %) tons/year) tons) (CO, short tons) tons) (CO) (CO2, %) tons/year) tons)		educed Lifetime Baseline of Lifetime Amount CO2, short Engines Retrofitted Reduced (CO2,	Lifetime Amount Capital Cost Emitted After Effectiveness Retrofit, Retrofitted (\$/short ton), Engines (CO2, short
	42.5) (HC,%) tons/year) tons) (HC, short tons) tons) tons) (HC) (CO,%) tons/year) tons) (CO, short tons) tons) (CO) (CO2,%) tons/year) tons)	(CO2, short tons) short tons)	tons) (CO2)
0.0262 0.0611 \$2.835,585,32 54% 0.0833 0.045 0.0833 0.045 0.0833 \$1.648,772.27 -111% 0.5417 -0.6013 0.5417 -0.6013 1.1429 \$0.00 26,68% 28,125 7.5018		7.5038 28.125 7.503	38 20.6213 \$9.887.86

	17I-	Commendat Fishing	- Describing			4000	2010 PiI	III CD			340		42.007	1 475	F20/	4 7047	0.0347	4.7047	0.0347	0.00	CEC 400 00	700/	0.0457	204 0.0457
							Replacement -																	
							Engine																	
Type		Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation Cos	t (NOx, %)	tons/year)	tons)	(NOx, sh	nort tons) short ton	s) tons)	(NOx) (PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)
				Number of Engine			Technology		Traveled/Year						ed (NOx, short						ofitted Engines Percent Redu			Engines Retrofitted
									Vehicle Miles									Baseline of Lifetime						Lifetime Baseline of
															Baseline of				Emitted a		tiveness	Baseline of Er	gines	
																			Liletime	Amount Capit	ai Cost			

	Lifetime Amount	Capital Cost						Lifetime Amount	Capital Cost						Lifetime Ar	nount Cap	ital Cost					Lifetime Amount	Capital Cost
	Emitted After	Effectiveness		Baseline of Engines				Emitted After	Effectiveness		Baseline of En	igines			Emitted Aft	er Effe	ctiveness	Baseline of	Engines			Emitted After	Effectiveness
Lifetime Amount	Retrofit, Retrofitte	d (\$/short ton),		Retrofitted per year	Amount Reduced	Lifetime Baseline o	Lifetime Amount	Retrofit, Retrofitted	(\$/short ton),		Retrofitted pe	r year Amount Redu	ed Lifetime B	Baseline of Lifetime Am	ount Retrofit, Re	trofitted (\$/s	hort ton),	Retrofitted	per year Amount Redu	ced Lifetime Baseline	e of Lifetime Amount	Retrofit, Retrofitt	ted (\$/short ton),
Reduced (PM2.5,	Engines (PM2.5,	Retrofitted Engine	s Percent Reduced	(HC, short	per Year(HC, short	Engines Retrofitted	Reduced (HC, short	Engines (HC, short	Retrofitted Engines	Percent Reduced	(CO, short	per Year(CO, s	hort Engines R	etrofitted Reduced (CC), short Engines (Co	D, short Reti	rofitted Engines Percent Re	duced (CO2, shor	per Year(CO2,	short Engines Retrofit	ted Reduced (CO2,	Engines (CO2, she	ort Retrofitted Engines
short tons)	short tons)	(PM2.5)	(HC, %)	tons/year)	tons)	(HC, short tons)	tons)	tons)	(HC)	(CO, %)	tons/year)	tons)	(CO, short	t tons) tons)	tons)	(CO	(CO2, %)	tons/year)	tons)	(CO2, short tons) short tons)	tons)	(CO2)
0.03	61 0.009	96 \$1,449,378.	87 639	6 0.044	0.0282	0.044	3 0.0282	0.0166	\$1,854,834.80	34	196 (0.2912	0.099	0.2912	0.099	0.1922	\$528,753.81	40%	22.5	9	22.5	9 1	3.5 \$5,815.78

																			Lifetime Amount	Capital Cost					
														Baseline	of Engines				Emitted After	Effectiveness		Baseline of Engir	ines		
								Vehicle Miles						Retrofitte	ed per year Amount I	Reduced Life	etime Baseline of L	ifetime Amount	Retrofit, Retrofitte	d (\$/short ton),		Retrofitted per 1	year Amount Reduced	Lifetime Baseline o	νf
			Number of Engines	s		Technology		Traveled/Year					Percent Reduc	ed (NOx, sho	ort per Year(NOx, short Eng	gines Retrofitted F	Reduced (NOx,	Engines (NOx, sho	rt Retrofitted En	gines Percent Reduced	(PM2.5, short	per Year(PM2.5,	Engines Retrofitted	1
Type	Sector	Engine Type	Retrofitted	Model Year	Retrofit Year	Description	Fuel Type	(VMT)	Horsepower	Usage Rate/Year	Unit Cost	Installation (ost (NOx, %)	tons/yea	r) tons)	(NO	Ox, short tons) s	hort tons)	tons)	(NOx)	(PM2.5, %)	tons/year)	short tons)	(PM2.5, short tons)	.)
						Engine																			
						Replacement -																			
***********	Commorcial Eichie	ag Bronulsion			1001	2019 Diocol	III.CD			200	ė	4E 207	11 475	E09/	0.7027	0.2069	0.7027	0.206	0 0 20	60 61420	.00 22	100/	0.02 0.015	E6 0.0	12

Lifetime Amount Capital Cost

	Emi	itted After	Effectiveness		Baseline of Engines				Emitted After	Effectiveness		Baseline of Engli	nes			Emitted After	Effec	tiveness	Baseline of Eng	ines			Emitted After	Effectiveness	i .
Lifetime An	nount Ret	rofit, Retrofitted	(\$/short ton),		Retrofitted per year	Amount Reduced	Lifetime Baseline of	Lifetime Amount	Retrofit, Retrofitted	(\$/short ton),		Retrofitted per y	ear Amount Reduced	Lifetime Base	eline of Lifetime Amoun	t Retrofit, Retrof	itted (\$/sh	ort ton),	Retrofitted per	year Amount Reduced	Lifetime Baseline	f Lifetime Amount	Retrofit, Retrofitte	(\$/short ton),	,
Reduced (P	M2.5, Eng	gines (PM2.5,	Retrofitted Engines	Percent Reduced	(HC, short	per Year(HC, short	Engines Retrofitted	Reduced (HC, short	Engines (HC, short	Retrofitted Engines	Percent Reduced	(CO, short	per Year(CO, sho	rt Engines Retr	ofitted Reduced (CO, sh	ort Engines (CO, sh	ort Retro	fitted Engines Percent Reduced	(CO2, short	per Year(CO2, sho	t Engines Retrofitte	Reduced (CO2,	Engines (CO2, shor	t Retrofitted Er	ngines
short tons)	sho	rt tons)	(PM2.5)	(HC, %)	tons/year)	tons)	(HC, short tons)	tons)	tons)	(HC)	(CO, %)	tons/year)	tons)	(CO, short to	ins) tons)	tons)	(CO)	(CO2, %)	tons/year)	tons)	(CO2, short tons)	short tons)	tons)	(CO2)	
	0.0156	0.0044	\$2 621 42E DI	519	0.0100	0.0121	0.0109	0.0121	0.0077	¢4 601 417 40	210	v 0	130	104	0.130	0.04	000	£1 420 220 60 4	ner -	1 75 /	E 11 1	E /	E 6 -	E 613	618 22

Lifetime Amount Capital Cost

Lifetime Amount Capital Cost

Detailed Report From the Glevel Cinisions Question

	Tulstip Trib	ies	•	1																																					
ту	pe	Sector	Engine Type	Total Vessel Engines	Number	r of Engines rofitted	Model Year	Retrofit Year	Activity Hours	Technology Description	FuelType	Fuel Volume	Calculated Fuel Volume	Horsepower	Displacement (liters per cylinder) 5.0 cn size <15.0	New Model Year	Diesel Fuel Reduced (gallons)	Unit Cost	Installation Cost	Annual Baseline of Engines (NOs, short tons)	Lifetime Baseline of Engines (NOx, short tons)	Percent Reduced (NOx, %)	Retrofitted per year (NOx, short	Amount Reduced per Year(NOx, short tons)	of Engines Retrofitted (NOx,	Elfetime Amount Reduced (NOx, short tons)	Emitted After Retrofit,	Effectiveness (\$/short toe),	Annual Baseline of Engines (PM2.5, short tons)	f Lifetime Baseline of Engines (PM2.5, short tons)	Percent Reduced (PM2.5, %)	Retrofitted per year (PM2.5, shor	Amount Reduce per Year(PM2.5; short tons)	of Engines Retrofitted (PM2.5,	Lifetime Amount Reduced (PM2.5, short tons)	Emitted After Retrofit,	Effectiveness (\$/short toe),	Annual Baseline of Engines (HC, short tond	Lifetime Baseline of Engines (HC, short toes)	Percent Reduced (HC, %)	Retrofitted per year (HC, short
Marine Ve	ssels Con	mmercial Fishing	Propulsion			1	1990	201	18 153	Replacement - Diesel	ULSD	19200	19200	375	5.0 <= size <15.0	2018	1829	\$40,967	\$33,046	5.170540843	5.170540843	49%	5.1305	2.5336	5.1705	2.5336	2.637	\$29,214.1	7 0.09090481	0.090304811	481	0.090	0.06	0.0903	0.0433	0.047	\$1,707,550.22	0.051860993	0.051860991	43%	0.0519

Amount Reduced per Year(HC, short	of Engines	Lifetime Amount	Emitted After	Effectiveness	Annual Baseline of	Lifetime Baseline	Percent Reduced	Retrofitted per	Amount Reduced per Year(CO, short		Lifetime Amount Reduced (CO, short			Annual Baseline of Engines (CO2, short	Lifetime Baseline of Engines (CO2, short	4	Baseline of Engines Retrofitted per year	Amount Reduced per Year(CO2, short		Lifetime Amount Reduced (CO2, short	Lifetime Amount Emitted After Retrofit,	Capital Cost Effectiveness (\$/short ton),
per rear(HC, short tons)	Retrofitted (HC,	tens)	Retrofit,	(\$/short ton),	tonsi	short tons)	(CO, %)	year (CO, short	tons)	(CO, short tons)	tons)	Retrofitted Engines (CO, short tons)	Retrofitted Engines (CO)	tons)	tons)	Percent Reduced (CO2, %)	(CO2, short tons/year)	tors)	(CO2, short tons)	tons)	Retrofitted Engines (CO2, short tons)	Retrofitted Engines (CO2)